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## Water quality — Vocabulary

*Qualité de l'eau — Vocabulaire*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 147, *Water*, Subcommittee SC 1, *Terminology*.

This first edition cancels and replaces the all editions of ISO 6107-1 to ISO 6107-8, which have been technically revised.

The main changes compared to the previous edition are as follows:

- Obsolete terms were removed
- Most terms related to waste water treatment committees such as ISO TC 275 Sludge recovery, recycling, treatment and disposal and ISO TC 224 Service activities relating to drinking water supply, wastewater and storm water systems were removed because they are not in the scope of ISO TC 147 Water quality
- Most terms were amended and enhanced to align with specific fields such as microbiology, chemistry etc.
- Addition of terms that were not covered in previous editions.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

The definitions in this edition of ISO 6107 are based on available standards and aim to harmonise the understanding of terms used within ISO TC147 *Water quality* to facilitate clear understanding and application of the water quality standards and to reduce variation of interpretation as far as possible. Source information is provided where available. This standard aims to improve and feed the terminology database for ISO TC147 and to serve as a reference document for all water quality characterisation committees and users.

Terms and the interpretation thereof may differ in various fields i.e.: chemistry microbiology and ecotoxicology. This is indicated in brackets, if applicable, after the term being defined.

ISO 6107 is restricted to definitions for terms which appear in standards of ISO/TC 147 *Water quality*.

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# Water quality — Vocabulary

## 1 Scope

This document defines terms used in certain fields of water quality characterization.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1

#### **abiotic degradation**

#### **non-biological degradation**

process by which a substance is chemically or physically broken down to smaller

Note 1 to entry: Examples of chemical or physical processes are hydrolysis and photolysis.

### 3.2

#### **absolute salinity**

ratio of mass of dissolved material in seawater (in grams) to the mass of seawater (in kilograms)

Note 1 to entry: In practice, this quantity cannot be measured directly and a practical salinity is defined for reporting oceanographic observations.

### 3.3

#### **abstraction**

removal of water from any source, either permanently or temporarily, so that it ceases to be part of the resources of that area, or is transferred to another source within the area

### 3.4

#### **acclimatization**

process of adaptation of populations of organisms to natural environmental changes or to long-term changes caused by human activities (such as those caused by continued discharge of industrial waste or sewage)

### 3.5

#### **accuracy**

closeness of agreement between a measured quantity value and a true quantity value of a *measurand* (3.31)

Note 1 to entry: The concept 'measurement accuracy' is not a quantity and is not given a numerical quantity value. A measurement is said to be more accurate when it offers a smaller measurement error.

Note 2 to entry: 'Measurement accuracy' is sometimes understood as closeness of agreement between measured quantity values that are being attributed to the measurand.

Note 3 to entry: See also ISO 13843 for water microbiology

**3.6  
acid rain water**

rain water with a pH value of less than 5

**3.7  
acidity**

presence of an excess of hydrogen ions over hydroxyl ions ( $\text{pH} < 7$ )

**3.8  
activated carbon treatment**

process intended for the removal of dissolved and colloidal organic substances from water and waste water by adsorption on activated carbon

EXAMPLE For the amelioration of taste, odour or colour.

**3.9  
action limit  
control limit**

line on a *control chart* (3.139) used for judging the stability of a process

Note 1 to entry: Action lines are drawn on a control chart to represent action limits.

Note 2 to entry: When the measure plotted lies beyond an action limit, appropriate corrective action is taken on the process.

Note 3 to entry: These limits are based on the assumption that only 0,5 % of normally distributed results will fall outside these limits. Such an occurrence would strongly indicate that additional, assignable causes of variation might be present and that action might be required to identify and reduce them.

**3.10  
activated sludge**

accumulated biological mass [*floc* (3.233)] produced in the treatment of wastewater by the growth of bacteria and other microorganisms in the presence of dissolved oxygen

**3.11  
activated sludge treatment**

process for the biological treatment of wastewater in which a mixture of wastewater and *activated sludge* (3.10) is agitated and aerated

Note 1 to entry: The activated sludge is subsequently separated from the treated wastewater by sedimentation and is removed or returned to the process as required.

**3.12  
adsorption on activated sludge**

*adhesion* of particles or *molecules* from a gas, liquid or dissolved solid (adsorbate) to a *surface* (called the adsorbent)

**3.13  
aeration**

introduction of air into a liquid

**3.14  
aerobic condition**

descriptive of a condition in which dissolved oxygen is present

**3.15  
aerobic organisms  
aerobes**

organisms generally requiring the presence of dissolved or gaseous oxygen for survival or multiplication

**3.16****aerobic sludge digestion**

biological process whereby primary, activated or co-settled sludges are partially oxidized by prolonged *aeration* (3.13), largely accomplished by endogenous respiration and predator activity

**3.17****agglomeration**

coalescence of flocs or particles of suspended matter to form larger flocs or particles which settle or may be caused to float more readily

**3.18****aggressive water**

water having a negative *Langelier index* (3.314)

**3.19****aggressivity**

tendency of a water to dissolve calcium carbonate

Note 1 to entry: See *Langelier index* (3.314).

**3.20****air scouring**

process of passing air under pressure upwards through a gravity filter to agitate the filtration medium/media, in order to loosen the retained solids before back-washing

**3.21****algae**

large group of single- or multi-cellular eukaryotic organisms, which usually contain chlorophyll or other pigments

Note 1 to entry: Algae are usually aquatic and capable of photosynthesis.

**3.22****alkalinity**

quantitative capacity of aqueous media to neutralize hydrogen ions

**3.23****alpha factor**

ratio of the oxygen transfer coefficient in mixed liquor to the oxygen transfer coefficient in clean water in an activated sludge plant

**3.24****alternating double filtration****ADF**

process for treatment of sewage by biological filtration in two stages with intermediate separation of humus by settlement

Note 1 to entry: At intervals, the order of use of the filters, but not of the humus tanks, is reversed. This allows operation of the plant at higher biological oxygen demand (BOD) loadings than possible with single filtration or ordinary double filtration, without troublesome accumulation of film at the surface of the filters and ponding.

**3.25****ammonia stripping**

method of removing ammoniacal compounds from water by making it alkaline and aerating

**3.26****ammoniacal nitrogen**

nitrogen present as free ammonia and as ammonium ions

**3.27**

**ammoniation**  
**chloramination**

addition of ammonia to water to form chloroamines, following chlorination as a treatment process

**3.28**

**ammonification**

bacterial conversion of nitrogen-containing compounds to ammonium ions

**3.29**

**anaerobe**  
**anaerobic organism**

organism requiring the absence of dissolved or gaseous oxygen for survival or multiplication

**3.30**

**anaerobic condition**

descriptive of a condition in which dissolved oxygen is absent

**3.31**

**analyte**  
**measurand**

<chemical or physical parameter> substance to be analysed

Note 1 to entry: The specification of a measurand requires knowledge of the kind of quantity, description of the state of the phenomenon, body, or substance carrying the quantity, including any relevant component, and the chemical entities involved.

Note 2 to entry: In microbiology, the analyte is ideally defined as a list of taxonomically defined species

**3.32**

**analytical portion**  
**test portion**

<microbiology> volume of particle suspension inoculated into a detector unit

Note 1 to entry: The detector unit can be, for example an agar plate, membrane filter, test tube or microscopic grid square.

**3.33**

**analytical portion**  
**test portion**

<chemistry>measured amount (volume) of a test sample being used in a test.

**3.34**

**anionic surface active agent**

surface active agent which ionizes in aqueous solution to produce negatively charged organic ions, which are responsible for the surface activity

**3.35**

**anoxic**

condition in which the concentration of dissolved oxygen is so low that certain groups of microorganisms preferentially use oxidized forms of nitrogen, sulphur, or carbon as an electron acceptor

**3.36**

**antagonism**

decrease of a biological effect caused by another substance due to the presence of another substance

Note 1 to entry: The combined effect is less than the additive effects of the separate substances or organisms.

**3.37**

**aphotic zone**

part of a body of water in which there is insufficient light for effective *photosynthesis* ([3.397](#))

**3.38****apparent selectivity**

<microbiology> ratio of the number of target colonies to the total number of colonies in the same sample volume calculated mathematically as selectivity

**3.39****application range**

range of concentrations routinely measured by a method

**3.40****aquifer**

water-bearing formation (bed or stratum) of permeable rock, sand, or gravel capable of yielding significant quantities of water

**3.41****aquifer**

<confined> underground layer of water-bearing permeable rock confined between two impermeable strata

**3.42****aquifer**

<unconfined> underground layer of water-bearing permeable rock in which the water table defines the upper boundary of the groundwater body

**3.43****archaea**

prokaryotic single celled organisms which lack cell nuclei and are morphologically similar to bacteria but radically different in molecular organization, with eukaryote-like metabolic pathways and enzyme production

**3.44****area-integrated sample**

composite water sample obtained after combining a series of samples taken at various locations from a body of water at a particular depth

**3.45****area of influence**

area influenced or expected to be influenced, based on the available information

**3.46****area profile sample**

series of individual water samples taken at various locations from a body of water at a particular depth

**3.47****automatic sampling**

process whereby samples are taken either discretely or continuously, independently of human intervention, and according to a predetermined programme

**3.48****autotrophic bacteria****chemolithotrophic bacteria**

microorganisms that are able to make their own energy by converting inorganic substances to organic substances that can be broken down

**3.49****available chlorine****total available chlorine**

chlorine present in the form of free chlorine or combined chlorine or both

**3.50**

**background equivalent concentration**

**BEC**

concentration of an element or substance that would produce the observed baseline when compared to zero

**3.51**

**background growth**

continuous cover of micro-colonies of non-mutated, non-target bacteria on the surface of a growth medium

**3.52**

**backwashing**

operation of cleaning a filter with water by reversing the direction of flow

Note 1 to entry: This is often aided by scouring with air.

**3.53**

**bacteria**

large group of microscopic, metabolically active, single-cell prokaryotic microorganisms with dispersed (not discrete) nucleus, mostly free-living, and usually multiplying by binary fission

**3.54**

**bacteriological sample**

sample taken aseptically in a sterile container and suitably preserved and handled for bacteriological examination

**3.55**

**bacteriophage**

group of particular viral agents whose life cycle occurs in specific bacterial hosts

Note 1 to entry: See also *viruses* ([3.603](#)).

**3.56**

**balancing tank**

tank designed to equalize the rate of flow or the composition of, for example, *drinking water* ([3.193](#)) to a distribution system or waste water to a treatment works

**3.57**

**bank filtration**

induced infiltration of river water through bankside gravel strata with the intention of improving the water quality

Note 1 to entry: A means for inducing this type of infiltration is by pumping water from wells sunk into the gravel strata so as to create a hydraulic gradient.

**3.58**

**bankside storage**

storage of raw river water in a reservoir on the river bank

**3.59**

**baseline survey**

survey with emphasis on characterization and description of biotic and abiotic conditions in the survey area, and which forms the background reference level for future monitoring and/or follow-up surveys

**3.60**

**benthic deposit**

accumulation, on the bed of a watercourse or lake or the sea, of deposits possibly containing organic matter and arising from such causes as natural erosion, biological processes or discharge of wastewater

**3.61****benthic region**

generally the lowest region of a water body, including sediments and a bedrock layer, where living organisms are present

**3.62****beta factor**

ratio of the oxygen saturation value in mixed liquor to the oxygen saturation value in clean water at the same temperature and atmospheric pressure in an activated sludge plant

**3.63****bias**

estimate of a systematic measurement error

**3.64****bioaccumulation**

process of accumulation of a substance in organisms or parts thereof

**3.65****bioassay****biotesting**

technique for evaluating the biological effect, either qualitatively or quantitatively, of various substances in water by means of changes in a specified biological activity

**3.66****biochemical oxidation**

process whereby microorganisms oxidize matter (mainly organic) in water

**3.67****biochemical oxygen demand****BOD**

mass concentration of dissolved oxygen consumed under specified conditions by the biological oxidation of organic and/or inorganic matter in water

**3.68****biodegradability**

susceptibility of an organic substance to biodegradation

**3.69****biodegradation maximum level**

maximum degree of biodegradation of a chemical compound or organic matter in a defined test above which no further biodegradation takes place during the test

Note 1 to entry: The biodegradation maximum level is expressed as a percentage.

[SOURCE: ISO 10708:1997, 3.9, modified — Note 1 to entry was previously part of the definition, the term has been changed from "maximum level of biodegradation".]

**3.70****biodegradation phase**

time from the end of the *lag phase* ([3.310](#)) in a defined test until about 90 % of the *biodegradation maximum level* ([3.69](#)) has been reached

[SOURCE: ISO 10708:1997, 3.10, modified — The part of the definition "it is expressed in days" is not included.]

**3.71****biofilm**

film, consisting of living, dead or moribund organisms, that forms on the surfaces of a support medium

**3.72**

**biological filter**

bed of inert material with large holes through which wastewater is caused to percolate for the purpose of purification by means of an active biological film (bacteria bed) on the inert material

Note 1 to entry: Also known as trickling filter percolating filter.

**3.73**

**biomass**

total mass of living material

**3.74**

**biomineralization**

*mineralization* ([3.344](#)) brought about by biological activity

**3.75**

**biota**

living components of an aquatic system

**3.76**

**biotic index**

numerical value used to describe the biota of a water body, serving to indicate its biological quality

**3.77**

**biotope**

area of uniform environmental conditions providing a living place for a specific assemblage of plants and animals

Note 1 to entry: Biotope is almost synonymous with the term habitat, but while the subject of a habitat is a species or a population, the subject of a biotope is a biological community.

**3.78**

**black water**

waste water and excreta from water closets, excluding water from baths, showers, hand basins and sinks

**3.79**

**blank value**

observed value obtained when measurement is made on a sample identical to the sample of interest, but in the absence of the *determinand* ([3.172](#))

[SOURCE: ISO 5667-14:2014, 3.5, modified — The term has been changed from 'blank'.]

**3.80**

**blank sample**

sample used for zeroing an instrument during a test procedure and can correct for potential error from existing colour or *turbidity* ([3.588](#)) in the sample before reagents are added

**3.81**

**blowdown**

removal of liquids or solids, or a mixture of both, from a processing or storage vessel, or a line, by the use of pressure

**3.82**

**boiler water**

water of adequate quality present in a boiler when steaming is, or has been, in progress

**3.83**

**bottom sediment**

solid material deposited by settling from suspended particulate matter (SPM) onto the bottom of bodies of water, both moving and static

**3.84****bourne**

spring which flows intermittently or seasonally

**3.85****brackish water**

water containing dissolved solids at a concentration higher than acceptable standards for intended use

Note 1 to entry: The concentration of total dissolved solids in brackish water can vary from 1 000 mg/l to 10 000 mg/l. Brackish water is less saline than sea water (1 000 to 10 000 mg/l of TDS for brackish vs up to 35 000 mg/l for sea water).

Note 2 to entry: The concentration of total dissolved solids of many brackish waters can vary considerably over space and/or time

**3.86****breakdown point**

smallest percentage of outlier interlaboratory testing above which the estimation method may be entirely inapplicable

**3.87****break-point chlorination**

addition of chlorine to water to the point where free available residual chlorine increases in proportion to the incremental dose of chlorine being added

Note 1 to entry: At this point, all of the ammonia has been oxidized.

**3.88****brine**

water naturally or artificially containing a higher concentration of salts, especially sodium chloride, than sea water

**3.89****brook**

small stream often fed by natural springs

**3.90****calibration blank solution****reagent blank solution**

prepared in the same way as the calibration solution or reagent but leaving out the *analyte* (3.31)

**3.91****calibration check solution****control standard**

reference substance solution produced independently of the stock solutions

EXAMPLE a solution from an alternative batch or manufacturer. The solution should contain all of the substances to be determined.

**3.92****calibration solution**

solution used to calibrate the whole procedure of the determination or an individual part of it (e.g. extraction or the instrumental measurement). It is prepared from (a) stock solution(s) or from a certified standard

**3.93****calibration standard**

solution prepared from a standard and/or stock solutions and used to calibrate the response of the instrument with respect to analyte concentration

**3.94**  
**calibration verification standard**  
**VER**

midpoint *calibration standard* (3.93) that is used to verify calibration

**3.95**  
**canal**

artificial watercourse constructed, usually, to join rivers, lakes or seas, and often of a size suitable for navigation

Note 1 to entry: Most canals have low flow and poor mixing characteristics.

**3.96**  
**carcinogen**  
**carcinogenic substance**

substance capable of inducing malignant growth (cancer) in humans, animals or plants

**3.97**  
**catchment basin**

area draining naturally to a water course or to a given point

**3.98**  
**categorical characteristic**

method performance characteristic numerically expressed as a relative frequency based on presence/absence (P/A) or +/- classification

**3.99**  
**cationic-surface active agent**

agent which ionizes in aqueous solution to produce positively charged organic ions which are responsible for the surface activity

**3.100**  
**central line**

line on a *control chart* (3.139) representing the long-term average or a pre-specified value of the statistical measure being plotted

**3.101**  
**centrifugation**

separation technique, by rotating the sample at high speed based on the various densities of compounds present in the sample

**3.102**  
**certified reference material**  
**CRM**

reference material, accompanied by documentation issued by an authoritative body and providing one or more specified property values with associated uncertainties and traceabilities, using valid procedures

EXAMPLE Human serum with assigned quantity value for the concentration of cholesterol and associated measurement uncertainty stated in an accompanying certificate, used as a calibrator or measurement trueness control material.

Note 1 to entry: 'Documentation' is given in the form of a certificate' (see ISO Guide 31).

Note 2 to entry: Procedures for the production and certification of certified reference materials are given, e.g. in ISO Guide 34 and ISO Guide 35.

**3.103**  
**cesspool**  
**cesspit**

watertight tank, mostly underground, used for collecting sewage from premises not connected to the public sewer and which, unlike a *septic tank* (3.512), has no outflow

**3.104****check valve**

mechanical valve which allows fluids to pass in one direction only

Note 1 to entry: The pressure of fluids flowing through the valve in one direction has the effect of opening the valve, and in the other direction of closing it.

**3.105****chemical coagulation  
coagulation**

process of adding a chemical (the coagulant) which causes the destabilization and aggregation of dispersed colloidal material into flocs

**3.106****chemical oxygen demand  
COD**

measure of the oxygen required to fully oxidize all compounds, both organic and inorganic, in water

**3.107****chemical tracer**

chemical substance added to, or naturally present in a stream or body of water, that allows the flow of water to be followed

**3.108****chemical treatment**

process involving the addition of chemicals to achieve a specific result

**3.109****chloramine**

derivative of ammonia formed by substitution of one, two or three hydrogen atoms with chlorine atoms and all chlorinated derivatives of organic nitrogen compounds

Note 1 to entry: Chlorine atoms can come from monochloramine  $\text{NH}_2\text{Cl}$ , dichloramine  $\text{NHCl}_2$ , nitrogen trichloride  $\text{NCl}_3$ .

**3.110****chlorination**

process of adding to water either gaseous chlorine or compounds from which hypochlorous acid or hypochlorite ions are formed, in order, for example, to arrest bacterial plant or animal growth, to oxidize organic matter, to assist *coagulation* ([3.105](#)) or to reduce odour

Note 1 to entry: The main purpose is usually *disinfection* ([3.184](#)).

**3.111****chlorine demand  
chlorine requirement**

difference between the amount of chlorine added to a sample of water or waste water and the amount of total residual chlorine remaining at the end of a specified contact period

**3.112****clarification**

process in which particles are settled out in a large quiescent tank releasing clearer water as *effluent* ([3.201](#))

**3.113**

**clarifier**

**settling tank**

**sedimentation basin**

large tank where settling of suspended matter takes place

Note 1 to entry: The clarifier is often equipped with mechanical scrapers to gather the solid residue for removal from the bottom of the tank.

**3.114**

**coefficient of variation**

$C_V$

ratio of the standard deviation to the mean

Note 1 to entry: to entry:

$$C_V = \frac{\sigma}{\mu}$$

where

$\sigma$  is the standard deviation

$\mu$  is the average

Note 2 to entry: The coefficient of variation is expressed as a percentage.

**3.115**

**co-factor solution**

aqueous solution of chemicals required for activity of the enzymes in the S9-fraction

Note 1 to entry: The chemicals can be, for example, NADP, glucose-6-phosphate and inorganic salts.

**3.116**

**coliform organisms**

**total coliform organisms**

members of *Enterobacteriaceae* that expresses  $\beta$ -D-Galactosidase

Note 1 to entry: Generally, apart from *E. coli* (3.209), many of them are able to survive and multiply in the natural environment.

**3.117**

**collaborative test**

**interlaboratory test**

**interlaboratory comparison**

**ring test**

study in which each laboratory uses the same defined, or its own defined, analytical method to analyse identical portions of a test material for purposes such as method evaluation, laboratory proficiency testing, and certification of standard materials

**3.118**

**colloidal suspension**

suspension containing particles, often electrically charged, which do not settle but may be removed by *coagulation* (3.105)

**3.119****colony**

localised visible accumulation of microbial mass (such as prokaryotes, *bacteria* (3.53), micromycetes, yeasts and fungi) or organisms (such as *Dreissena* species) developed on or in a solid nutrient medium from a viable particle or organism

Note 1 to entry: Frequently, microcolonies from nearby viable particles, before becoming visible, fuse into one macrocolony. The number of visible colonies is, therefore, usually an underestimate of the number of viable particles.

**3.120****colony-forming unit****CFU****colony-forming particle****CFP**

organism (or cluster of organisms) with the ability to form a *colony* (3.119) under certain specified conditions

Note 1 to entry: The term was originally introduced to convey the idea that a colony may originate not only from a single cell but from a solid chain or aggregate of cells, a cluster of spores, a piece of mycelium, etc. It mistakenly equates the number of colonies observed to the number of living entities seeded on the medium. Growth unit, viable particle, propagule and germ are terms with the same meaning but convey the original idea.

Note 2 to entry: Unit by which the culturable number of microorganisms is expressed as the Maximum Likelihood Estimate (MLE) of the true concentration based on the number of bacterial colonies observed on a growth plate after inoculation from a sample aliquot.

**3.121****combined chlorine**

portion of the total residual chlorine present in the form of chloramines, organic chloramines and nitrogen trichloride

**3.122****combined sewerage system**

system in which wastewater and surface water run-off are carried in the same drains and sewers

**3.123****comminution**

mechanical shredding or grinding of gross solids in waste water to sizes more amenable to further treatment

**3.124****comparability**

degree of agreement between data obtained from different sources with respect to control over random and systematic errors

**3.125****compartmentalization**

process whereby substances in the environment migrate from one environmental compartment to various other compartments such as water, air, *biota* (3.75), soil and sediments

**3.126****composite sample**

two or more samples or sub-samples, mixed together in appropriate known proportions (either discretely or continuously), from which the average value of a desired characteristic may be obtained

Note 1 to entry: The proportions are usually based on time or flow measurements.

**3.127**

**concentration-effect relationship**

response to a concentration gradient of a known substance or mixture of substances which is described by pre-determined diagnostic indicators

Note 1 to entry: In the case of the umu-test for genotoxicity the induction of the umuC-gene is dependent on the concentration of genotoxic agents in the test sample.

**3.128**

**concentration of suspended solids of an activated sludge**

amount of solids obtained by drying a known volume of filtered activated sludge (30 µm pore size) at about 105 °C to constant mass

**3.129**

**confidence interval**

range of values within which the measured or calculated value is likely to be present within a stated level of confidence, for example 95 %

**3.130**

**confirmation coefficient**

**specificity value**

**true positive rate**

proportion of success in tests on microbiological cultures expressed as the fraction confirmed of the number of cultures tested

**3.131**

**confirmed colony count**

**colony count**

$x$

presumptive colony count corrected for false positives

Note 1 to entry: to entry:

$$x = pc = (k/n)c$$

where

$c$  is the *presumptive count* (3.432);

$p$  is the true positive rate;

$n$  is the number of presumptive positives isolated for confirmation;

$k$  is the number confirmed.

Note 2 to entry: For methods that do not require confirmation steps, presumptive count is equal to the confirmed count"

**3.132**

**confirmed count**

*presumptive count* (3.432) multiplied by the confirmation coefficient

Note 1 to entry: For methods that do not require confirmation steps, presumptive count is equal to the confirmed count

**3.133****congener**

substance con- (with) generated or synthesized by essentially the same synthetic chemical reactions and the same procedures

EXAMPLE Any one of the 209 individual PCBs. In this case, it is the substitution of chlorines for hydrogens on a common skeletal structure. The group of PCB congeners includes  $C_{12}H_{(10-n)}Cl_{(n)}$  where  $n = 0$  to 10.

**3.134****connate water**

interstitial water of the same geological age as the surrounding rock or bed, often of poor quality and unfit for normal use

Note 1 to entry: Normal uses can be, for example potable purposes, industrial and agricultural use.

**3.135****conservative substance**

substance whose chemical composition remains unchanged by natural processes or is changed only extremely slowly

Note 1 to entry: Also known as persistent substance, recalcitrant substance, refractory substance.

**3.136****contact stabilization**

modification of the *activated sludge* (3.10) process whereby previously aerated activated sludge is brought into contact with raw sewage for a short period of time (e.g. 15 min to 30 min)

Note 1 to entry: The sludge, after contact, is settled out and returned to a separate tank where it is aerated for a longer period of time (6 h to 8 h).

**3.137****continuous sampling**

process whereby a sample is taken continuously

Note 1 to entry: For example, from a body of water.

**3.138****control batch**

control medium, including organisms used for testing

Note 1 to entry: In the *umu*-test for genotoxicity control batches consist of culture medium without test bacteria, culture medium with inoculum and distilled water and culture medium with inoculum and dissolving agent.

**3.139****control chart**

chart, with upper and/or lower control limits on which values of some statistical measure for a series of samples or subgroups are plotted, usually in order by time or sample number

Note 1 to entry: The chart frequently shows a central line to assist detection of a trend of plotted values toward either control limit.

**3.140****cooling water**

water which is used to absorb and remove heat

**3.141****corrosivity**

ability of a water to attack various materials by means of chemical, physico-chemical or biochemical action

**3.142**

**count**

<microbiology> observed number of objects such as colonies or cells determined by direct counting, or *most probable number (MPN)* (3.350) estimation based on statistical calculation of the number of microorganisms in a specified volume of water, derived from the combination of positive and negative results in a series of volumes of the sample examined by standard tests

Note 1 to entry: this count is based upon an observed number of objects. Frequently, microcolonies from nearby viable particles, before becoming visible, fuse into one macrocolony. The number of visible colonies determined by direct counting is, therefore, usually an underestimate of the number of viable particles

**3.143**

**coverage factor**

numerical factor used as a multiplier of the (combined) standard uncertainty in order to obtain an expanded uncertainty

**3.144**

**cross connection**

physical pipe connection or arrangement of pipes between potable water and any source of contamination

Note 1 to entry: This term is also used to describe a legitimate connection between different distribution systems.

**3.145**

**critical pair**

two components of the chromatogram with the lowest calculated resolution between them

Note 1 to entry: Although the concept of a critical pair of solutes in a chromatographic separation is seemingly straightforward, it is reinterpreted or used several ways.

**3.146**

**culturable microorganism**

*bacteria* (3.53), yeast or mould capable of forming colonies on solid media or replicating in liquid media using specified growth media under specified conditions of cultivation

Note 1 to entry: Culturable microorganism per volume can replace CFU per volume or MPN per volume when giving a result

Note 2 to entry: Different media may allow culture of different populations of bacteria

**3.147**

**culture medium**

nutrients presented in a form and phase (liquid or solidified) which support microbiological growth

[SOURCE: ISO 19040-2:2018, 3.2.]

**3.148**

**cupro-solvent**

type of water which is able to dissolve copper from pipes and fittings

**3.149**

**cyanobacteria**

prokaryotic organisms which derive their energy through photosynthesis but lack a nucleus or membrane bound organelles like chloroplasts

**3.150**

**cyprinid**

fish belonging to the family *Cyprinidae* sometimes used as biological indicators of water quality

EXAMPLE      Roach, rudd or carp.

**3.151****D value**

smallest value of *D* at which, under the conditions of the standard, no positive increase in the number of visible mutant colonies per dish is detected

Note 1 to entry: In the case of more than one *D* value (up to four are possible), the highest *D* value is chosen. Applicable for Salmonella test method.

**3.152****deaeration**

partial or complete removal of dissolved air from water either under natural conditions or deliberately by physical processes

**3.153****decantation**

withdrawal of the supernatant liquor after settlement of suspended particulate matter, or after separation from a liquid of higher density

**3.154****decay constant**

$\lambda$

<radionuclide in a particular energy state> quotient of *dP* by *dt*, where *dP* is the probability of a given nucleus undergoing a spontaneous nuclear transition from that energy state in the time interval *dt*, where *N* is the number of nuclei of concern existing at time *t*

$$\lambda = \frac{dP}{dt} = -\frac{1}{N} \frac{dN}{dt}$$

**3.155****dechlorination**

partial or complete removal of *residual chlorine* (3.478) from water by any chemical or physical process

**3.156****deep well**

well which draws its water from below one or more strata

**3.157****degasification**

partial or complete removal of dissolved gases, usually by a physical process

Note 1 to entry: Also known as degassing.

**3.158****deionization**

partial or nearly complete removal of ionic species, particularly by the use of ion-exchange resins

**3.159****demineralization**

reduction of the content of ionic species and dissolved inorganic substances in water by a physical, chemical or biological process

**3.160****denitrification**

reduction of nitrate and/or nitrite to nitrogen or dinitrogen monoxide, usually by the action of *bacteria* (3.53)

**3.161****dense non-aqueous phase liquid****DNAPL**

organic compounds that have a low water solubility and a density greater than that of water, for example, chlorinated hydrocarbons such as trichloroethane

**3.162**

**deoxygenation**

partial or complete removal of dissolved oxygen from water, either under natural conditions or deliberately by physical or chemical processes

**3.163**

**depth-integrated sample**

composite water sample comprising discrete or continuous samples taken at a particular location from a body of water, either between the surface and sediment layer or between other defined depths in a vertical line and subsequently combined

**3.164**

**depth profile sample**

sample included in a series of water samples taken at various depths from a body of water at a specific point

Note 1 to entry: In order to obtain a characterization of the water quality throughout the entire water body, it is necessary to take depth profile samples at various locations.

**3.165**

**depuration**

process by which living aquatic organisms free themselves of impurities

**3.166**

**desalination**

partial or nearly complete removal of ionic species from water, usually to make it drinkable or usable as processing or cooling water

[SOURCE: ISO 20670:2018, 3.19, modified — Seawater, brackish water and irrigation water are not included ".]

**3.167**

**designated site**

biological classification of river's site within reach of a water course that is considered to be representative of the reach in terms of its quality

**3.168**

**destratification**

mixing of layers of subsurface and surface water in a lake or reservoir by natural forces or artificial means

**3.169**

**detection level**

**limit of detection**

measured quantity value, obtained by a given measurement procedure, for which the probability of falsely claiming the absence of a component in a material is  $\beta$ , given a probability  $\alpha$  of falsely claiming its presence

Note 1 to entry: IUPAC recommends default values for  $\alpha$  and  $\beta$  equal to 0.05.

Note 2 to entry: The abbreviation LOD is sometimes used.

Note 3 to entry: The term "sensitivity" is discouraged for 'detection limit'.

Note 4 to entry: The LOD is the lowest concentration of measurand in a sample that can be detected, but not necessarily quantitated under the stated conditions of the test.

**3.170**

**detection set**

**detector set**

combination of plates or tubes on which quantitative estimation of the numbers of microorganisms is based

**3.171****detector****particle detector**

plate of solid matrix or a tube of liquid containing a nutrient medium for counting or detecting viable microorganisms

**3.172****determinand**

that which is to be determined

**3.173****determination**

entire process from preparing the test sample solution up to and including measurement and calculation of the final result

**3.174****detritus**

coarse inorganic material associated with organic matter, capable of being transported in moving water in sewage treatment practice or in biological context, dead organisms and organic particulate matter, either settled or not

**3.175****dewatering**

process whereby wet sludge, usually conditioned by a coagulant, has its water content reduced by physical means

**3.176****dezincification**

selective dissolution of zinc from brass or another zinc-containing alloy by contact with water of certain chemical properties

Note 1 to entry: A plumbing fitting is an example of a zinc-containing alloy that can undergo dezincification.

**3.177****dialysis**

process by which small molecules or ions diffuse through a membrane, thus causing their separation from larger molecules in solution and from suspended matter

**3.178****diatom**

unicellular algae of the class *Bacillariophyceae* having cell walls of silica

**3.179****dilution level**

*D*

denominator of the dilution coefficient (using the numerator 1) of a mixture of water or waste water with dilution water as integral number

Note 1 to entry: For undiluted water or waste water, this coefficient is 1:1, where the corresponding and smallest possible *D* value is 1.

**3.180****dilution series**

mixture of test material and dilution matrix (for instance water or buffer) in proportions pre-defined for testing purposes

**3.181****dilution water**

deionized water for stepwise dilution of the test sample or as *negative control* ([3.355](#))

**3.182**

**dioxin-like isomer**

polychlorinated biphenyl (PCB) with typical PCB chemical composition that has dioxin-like properties, reacts with the Ah receptor and is assigned a toxic equivalence factor (TEF)

**3.183**

**discrete sampling**

process whereby single samples are taken from a body of water

**3.184**

**disinfection**

treatment of water intended to eliminate or inactivate pathogens

**3.185**

**dissolved organic carbon**

**DOC**

part of the organic carbon in water which cannot be removed by specified phase separation

Note 1 to entry: Phase separation may be specified for example by *centrifugation* (3.101) at 40 000 m·s<sup>-2</sup> for 15 min or by membrane filtration using membranes with pores of 0,2 µm to 0,45 µm diameter.

Note 2 to entry: See also *total organic carbon* (3.578).

**3.186**

**dissolved solid**

substance remaining, after filtration and evaporation to dryness of a sample, under specified conditions

**3.187**

**dissolved-oxygen curve**

graphically or mathematically derived curve that represents the profile of dissolved oxygen content along the course of a stream

**3.188**

**distillation**

process of evaporation followed by condensation used, for example, to prepare water of high purity

**3.189**

**DNA**

**deoxyribonucleic acid**

hereditary genetic material making up the *genome* (3.253) of all organisms with the exception of RNA viruses

Note 1 to entry: DNA differs from *RNA* (3.482) in that it contains thymine instead of uracil as one of the nucleotides.

Note 2 to entry: Adapted from ISO 13829.

**3.190**

**DNA damage**

collective description for various changes in *DNA* (3.189) that do not affect cell replication

Note 1 to entry: In the case of *genotoxicity tests* (3.255) this refers to mutations which result in the induction of the umuC-gene.

**3.191**

**dose response relationship**

reduction of the number of visible mutant colonies per dish with increasing *D* level

Note 1 to entry: most applicable in *Salmonella* microsome test.

**3.192****drainage area**

area draining to one or more points, the boundaries of which are specified by a duly appointed authority

**3.193****drinking water****potable water**

water intended for human consumption, will not cause harm over lifetime of consumption and does not contain detectable objectionable contaminants, either chemical, radiological or infectious agents

**3.194****dry deposition**

deposition onto the Earth's surface of substances other than water in its various forms

**3.195****dry well**

chamber, below ground level, that remains dry, and houses pumping apparatus with its associated pipework and equipment

**3.196****dynamic toxicity test**

toxicity test with constant flow or continuous flow of test solution

**3.197****dystrophic water**

water which is poor in nutrients and contains a high concentration of humic substances

**3.198****EC<sub>50</sub>**

effective concentration of a compound which causes 50 % of an effect

**3.199****ecology**

study of the interrelation of living organisms and their environment

**3.200****ecosystem**

system in which, by the interaction of the different organisms present and their environment, there is a cyclic interchange of materials and energy

**3.201****effluent**

water or wastewater discharged from a containing space such as a treatment plant, industrial process or lagoon (3.311)

**3.202****effluent polishing**

tertiary treatment employing either further physical or biological processes

**3.203****effective porosity**

proportion of saturated openings or pores within a water-bearing formation which contribute directly to the flow of groundwater

**3.204****electrical conductivity****specific conductance**

reciprocal of the resistance, measured under specified conditions, between the opposite faces of a unit cube (of defined dimensions) of an aqueous solution

**3.205**

**enteric virus**

virus which can multiply in the gastro-intestinal tract of man and animals

**3.206**

**enterococci**

**faecal enterococci**

**intestinal enterococci**

group of aerobic and facultatively anaerobic Gram-positive bacteria which normally inhabit the large intestine of man and warm-blooded animals

Note 1 to entry: They possess the Lancefield's Group D antigen, are catalase-negative, capable of growth at 44 °C, and of hydrolysing aesculin in the presence of bile salts, able on specific media to reduce chloride of 2,3,5-triphenyl-tetrazolium in formazan, or to hydrolyse 4-methylumbelliferyl- $\beta$ -D-glucoside (MUG)

Note 2 to entry: See also ISO 7899-1 and ISO 7899-2.

Note 3 to entry: In aquatic environments, the group mainly consists of the species *Enterococcus faecalis*, *E. faecium*, *E. durans* and *E. hirae*. These species fail to multiply in most natural environments, but may survive longer than *Escherichia coli*. Therefore, their presence in water, even in the absence of *E. coli*, usually indicates faecal pollution.

**3.207**

**epilimnion**

top layer in a stratified body of water, above the thermocline, where the *photosynthesis* ([3.397](#)) is performed by algae

**3.208**

**equilibrium pH**

thermodynamically stable pH-value of a solution, or water body, when equilibrium is attained not only within the aqueous phase itself, but also between it and any other phases with which it may be in contact

**3.209**

***Escherichia coli***

***E. coli***

members of *Enterobacteriaceae* that expresses  $\beta$ -D-Galactosidase and  $\beta$ -D-Glucuronidase

[SOURCE: ISO 9308-1:2014, 3.2.]

Note 1 to entry: Its normal habitat is the large intestine of man and warm-blooded animals, and it is usually not able to multiply in aquatic environments. The presence of *E. coli* in water does, therefore, indicate recent faecal pollution.

**3.210**

**estuary**

partially enclosed body of water in the lower reaches of a river, which is freely connected with the sea and which receives fresh water supplies from upland drainage areas

**3.211**

**eukaryote**

organism with a cell structure in which the nucleus is surrounded by a nuclear membrane

**3.212**

**eukaryotic**

descriptive of organisms whose cells have a visible and definite nucleus

**3.213****eulittoral zone**

intertidal zone which is submersed and emerged, either periodically due to tides or a periodically due to irregularly occurring factors, as in the enclosed seas of the Baltic or the Mediterranean

Note 1 to entry: Biologically, this zone is defined as the zone between the upper limit of barnacles and the upper limit of laminarians. In the Baltic where there is no tide, the eulittoral zone is the zone of short-lived annual algae.

**3.214****euphotic zone**

upper layer of a body of water where light penetration is sufficient to support effective *photosynthesis* ([3.397](#))

**3.215****eutrophic water**

body of water rich in nutrients and highly productive in biomass

Note 1 to entry: See also *eutrophication* ([3.216](#)).

**3.216****eutrophication**

enrichment of water by nutrients, that induce and accelerate vegetal biomass production, accompanied by oxygen deficits, accumulation of organic matter and heavy changes in population composition and structure

**3.217****evapotranspiration**

total evaporation of an area covered with vegetation

Note 1 to entry: It is comprised of water that is intercepted by the vegetation followed by evaporation, the evaporation from the dry surface of plant leaves (transpiration), and the evaporation from the soil.

**3.218****exogenous respiration**

energy-yielding metabolism with the uptake of exogenous substrate

**3.219****expanded uncertainty**

quantity defining an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the *measurand* ([3.31](#))

Note 1 to entry: The fraction may be viewed as the coverage probability or level of confidence of the interval. To associate a specific level of confidence requires explicit or implicit assumptions regarding the probability distribution. The level of confidence may be attributed to this interval only to the extent to which such assumptions may be justified.

**3.220****expected natural community**

community of organisms present at a site in a water course where only natural stress occurs, and man-made stress is minimal

**3.221****extended aeration**

activated sludge sewage treatment process, operated at about one-third the loading of the conventional process to minimize the production of surplus activated sludge

Note 1 to entry: As the sludge wastage rate is low, the sludge age is high (about 50 days) and the surplus sludge is relatively stable. Also, slow-growing microorganisms can become established in the system and oxidize substances that would not otherwise be removed.

**3.222**

**facultative aerobe**

organism that can use oxygen as its terminal electron acceptor and will always choose to do so because the energy release is much greater

Note 1 to entry: This is replaced by a variety of fermentative pathways or other terminal electron acceptors such as nitrate and sulphate. When the oxygen availability is low it has the ability to use the alternative electron acceptor or run a fermentative metabolism.

**3.223**

**facultative anaerobe**

organism which produces ATP by aerobic respiration if oxygen is present but is capable of switching to fermentation or anaerobic respiration if oxygen is absent

**3.224**

**faecal coliform organism**

**thermotolerant coliform organism**

*coliform organism* (3.116) which can grow and which has the same fermentative and biochemical properties at 44 °C as it has at 37 °C

Note 1 to entry: *E. coli* has replaced faecal coliform organisms and thermotolerant coliform organisms as the preferred indicator of faecal origin.

**3.225**

**false negative rate**

result indicated by the test method to be negative which has subsequently been shown to contain the target organism

Note 1 to entry: See also ISO 13843 for water microbiology.

**3.226**

**false positive rate**

result indicated by the test method to be positive which was subsequently shown not to contain the target organism

Note 1 to entry: See also ISO 13843 for water microbiology.

**3.227**

**field capacity**

maximum amount of water that a soil can retain after gravitational water has drained away

**3.228**

**filter press**

filtration device with compartments formed by filter cloths clamped between a series of recessed drainage plates or flat plates and frames, into which sludge is pumped under pressure

**3.229**

**filter run**

length of time between one back-washing and the next in a filter

**3.230**

**filterability**

**filtrability**

indication of the ease with which the liquid can be separated from the solids by filtration

**3.231**

**filter press**

filtration device with compartments formed by filter cloths clamped between a series of recessed drainage plates or flat plates and frames, into which sludge is pumped under pressure

Note 1 to entry: Water is expressed from the sludge through the filter cloths and drainage system and the pressed sludge is removed after each filtration cycle.

**3.232****filtration**

treatment process whereby water is passed through a porous layer of material in order to retain particulate matter or micro-organisms

**3.233****floc**

fine fluffy mass formed by aggregation of fine suspended particles

Note 1 to entry: In water treatment it is formed in water by flocculation with chemicals. In activated sludge it is formed by agglomerated bacterial mass.

**3.234****flocculation**

formation of large separable particles by aggregation of small particles; the process is usually assisted by mechanical, physical, chemical or biological means

**3.235****flocculation aid**

substance, often a polyelectrolyte, which is added in conjunction with a coagulant to increase the effectiveness of floc formation

**3.236****flotation****floatation**

raising of suspended matter in water to the surface, for example by the entrainment of a gas on the suspended matter

**3.237****fluidized bed**

bed of small particles freely suspended by an upward flow of liquid, gas or combined liquid and gas

**3.238****flume**

artificial channel, with clearly specified shape and dimensions, which may be used for measurement of flow

**3.239****fluoridation**

addition of a compound containing fluorine to a *drinking water* (3.193) supply to maintain the fluoride ion concentration within agreed limits

**3.240****free carbon dioxide**

carbon dioxide dissolved in water

**3.241****free chlorine**

chlorine present in the form of hypochlorous acid, hypochlorite ions or dissolved elemental chlorine

**3.242****fresh water**

naturally occurring water having a low concentration of salts, or generally accepted as suitable for *abstraction* (3.3) and treatment to produce potable water

Note 1 to entry: Freshwater typically contains less than 1 000 mg/l of dissolved solids. The concentration of total dissolved solids can vary considerably over space and/or time.

**3.243**

**freshet**

comparatively high rate of flow of fresh water of short duration in a stream, resulting from heavy rainfall or rapid snow melt

**3.244**

**freshwater limit**

point of an estuary beyond which sea water does not usually penetrate under specified tidal and hydrological conditions

**3.245**

**F-specific RNA bacteriophage**

bacterial virus capable of infecting specific strains of host bacteria which have F- or sex-pili (fertility fimbriae)

Note 1 to entry: See also ISO 10705-1.

Note 2 to entry: These viruses commonly kill the host bacteria, demonstrated by the appearance of plaques (clearance zones) in confluent lawns of the host grown under appropriate culture conditions. Infection and the production of plaques is inhibited by the presence of appropriate concentrations of the enzyme RNase in the plating medium.

**3.246**

**full energy peak**

peak of spectral response curve corresponding to the total absorption of the photon energy in the sensitive detector volume by the photoelectric effect or by consecutive photon interactions of pair production (only for photon energy  $> 1\,022$  keV), Compton scattering and photoelectric absorption

**3.247**

**fulvic acid**

part of humic substance which is soluble in both acid and alkaline solutions

**3.248**

**fungi**

large group of heterotrophic organisms which usually form spores and have well-defined nuclei, but lack photosynthetic material such as chlorophyll

Note 1 to entry: Yeasts are single-celled fungi which reproduce by budding. Other fungi are multicellular and filamentous.

**3.249**

**gamma cascade**

two or more different gamma-photons emitted successively within the resolution time, from one nucleus when it de-excites through one or more intermediate energy levels

**3.250**

**gamma efficiency**

under stated conditions of detection, the ratio of the number of detected gamma-photons to the number of gamma-photons of the same type emitted by the radiation source in the same time interval

**3.251**

**gamma radiation**

electromagnetic radiation emitted in the process of nuclear transition or particle annihilation

**3.252**

**gamma-ray spectrometry**

method of measuring gamma rays yielding the energy spectrum of the gamma radiation

**3.253****genome**

total genetic material (nucleic acid, DNA or RNA) of a cell that codes genetic information

[SOURCE: ISO 13829:2000, A.4, modified — “that codes genetic information” added.]

**3.254****genotoxicity**

toxicity which specifically affects the genome and usually refers to physical or chemical agents which cause mutations

Note 1 to entry: Adapted from ISO 13829.

**3.255****genotoxicity test**

test system to determine genotoxic activity such as *DNA damage* (3.190) or DNA repair

Note 1 to entry: Adapted from ISO 13829.

**3.256****Gram-negative bacteria**

*bacteria* (3.53) that give a negative result in the Gram stain test by losing the crystal violet from their cell walls and being counterstained with safranin or fuchsine to appear pink or red under a microscope

**3.257****Gram-positive bacteria**

*bacteria* (3.53) that give a positive result in the Gram stain test by taking up the crystal violet stain into their cell walls (made of peptidoglycan) and appear purple under a microscope

**3.258****grazing organism**

organism such as worms, insect larvae and other invertebrate animals which removes the *zoogloal film* (3.613) on the surfaces of the medium in a biological filter, either by feeding activity or by dislodgement

**3.259****grey water****sullage**

waste water from household baths and showers, hand basins and kitchen sinks but excluding waste water and excreta from water closets

**3.260****groundwater**

water which is being held in, and can usually be recovered from, an underground formation

**3.261****guidance chart**

two-dimensional scattergram for presenting method-performance data (quantity or precision) with arbitrary guide values or guide values obtained by Type B evaluation of uncertainty

Note 1 to entry: In guidance charts, the horizontal axis is usually the colony count per detector.

**3.262****half-life period**

period of time after which the concentration or mass of a substance, undergoing degradation or decay, has fallen to half of its initial value

Note 1 to entry: The term is only applicable to zero- and first-order reactions.

**3.263****halocline**

layer in a stratified body of water in which the salinity gradient is at a maximum

**3.264**

**haloform**

compound in which three of the hydrogen atoms of the methane molecule have been substituted by chlorine, bromine or iodine atoms

**3.265**

**hard detergent**

detergent containing a surface-active agent, which is resistant to primary biodegradation, and whose surfactant properties are not substantially reduced in the biological treatment of sewage

**3.266**

**hard substrate**

substrate consisting of bedrock, larger rocks/stones or fixed marine constructions such as wharfs, quays and pipelines

**3.267**

**hard-substrate flora and fauna**

attached plants (algae or vascular plants) or animals, together with relatively stationary animals living on, or in close association with, hard substrate

EXAMPLE Attached: kelp, seaweeds, sponges, bryozoans, corals, mussels, barnacles, ascidians. Relatively stationary: snails, sea-urchins, crabs.

**3.268**

**hard water**

water that contains high concentrations of ions and in particular contains high concentrations of calcium and magnesium ions

Note 1 to entry: Hard water is generally accepted to contain between 121-180mg/l of hardness as CaCO<sub>3</sub>.

**3.269**

**Hazen number**

number used to indicate the intensity of colour of water, the standard unit being the colour produced by a solution containing 1 mg of platinum per litre [in the form of hydrogen hexachloroplatinate(IV)], in the presence of 2 mg of cobalt(II) chloride hexahydrate per litre

**3.270**

**head space**

vapour phase contained in a closed system, in equilibrium with the sample material (liquid, solid or mixture)

**3.271**

**heat treatment**

**thermal conditioning**

rising and/or holding temperature under specified conditions e.g. heating of sludge, often under pressure, to condition it so that it is more readily dewatered by a static or dynamic dewatering process

**3.272**

**heavy water**

water which contains a higher than normal proportion of the heavy isotopes of hydrogen in combination with oxygen

**3.273**

**heterotrophic bacteria**

*bacteria* (3.53) which require organic matter as a source of energy

Note 1 to entry: See also, in contrast autotrophic bacteria.

**3.274****homologue group**

group of compounds in which each member differs from the next by a specific number and kind of atoms

EXAMPLE Tetrachlorobiphenyls at a specific degree of chlorination, also called a congener group.

**3.275****humic acid**

part of a humic substance which is soluble in dilute alkaline solution but is precipitated by acidification

**3.276****humic substance**

complex and heterogeneous mixtures of polydispersed materials formed in soils, sediments, and natural waters by biochemical and chemical reactions during the decay and transformation of plant and microbial remains (a process called humification)

**3.277****humus sludge**

microbial film that sloughs off from a biological filter and is normally separated from the *effluent* (3.201) in a final settling tank

**3.278****hydraulic conductivity**

property of a water-bearing formation that relates to its capacity to transmit water through its internal, interconnected pathways

**3.279****hydrography**

applied science concerned with the study and measurement of seas, lakes, rivers and other waters

**3.280****hydrological cycle**

natural cycle in which water is evaporated from the earth's surface, mostly from the oceans, to the atmosphere and returns by precipitation to the earth

Note 1 to entry: It includes the uptake of water by plants followed by evapotranspiration and release of water as vapour to the atmosphere prior to its precipitation to the earth.

**3.281****hydrology**

applied science concerned with the water cycle of precipitation, run-off or infiltration and storage, evaporation and re-precipitation

**3.282****hydrometry**

measurement and analysis of the flow of water

**3.283****hypertrophic water**

class of eutrophic water generally referring to extremely high non-specific levels of enrichment characterized by extreme algal blooms

**3.284****hypolimnion**

water below the thermocline in a stratified body of water

**3.285****Imhoff cone**

conical transparent vessel, usually of capacity 1 litre and graduated, used for determining the volume of settleable matter in waters

**3.286**

**inclusiveness**

proportion of target organisms among the presumptive positives of the total target organisms, calculated as the number of true positives divided by the sum of true and false positives

**3.287**

**induction rate**

*I*

quotient of the mean signal measured after exposure to a dose of the test sample or with a *positive control* (3.422), and the mean signal measured for the *negative control* (3.355) using the same experimental conditions

**3.288**

**industrial wastewater**

water discharged after being used in, or produced by, an industrial process, and which is of no further immediate value to that process

**3.289**

**industrial water**

any water used for, or during, an industrial process

**3.290**

**infiltration**

<sewer> process of groundwater entering a drain or sewer through cracks or defective joints

Note 1 to entry: Infiltration can also take place into mains under conditions of negative pressure.

**3.291**

**inhibition of oxygen consumption**

decrease of the oxygen consumption rate of an activated sludge plus (a) degradable substance(s) in the presence of the test material, compared with that of a similar mixture without test material

Note 1 to entry: This quantity is expressed as a percentage.

Note 2 to entry: In the absence of a substrate, some chemicals (e.g. uncouplers of phosphorylation) can increase oxygen uptake.

**3.292**

**inhibitor**

substance which reduces the rate of a chemical or biological process

**3.293**

**in-line analysis**

system of automatic analysis in which at least the analytical sensor is sited in the body of water

**3.294**

**in situ analysis**

measurement taken in the same place where the phenomenon is occurring without isolating it from other systems or altering the original conditions of the test

**3.295**

**inoculum**

**inoculation material**

fraction of a culture of micro-organisms used to start a new culture, or an exponentially growing pre-culture, in fresh culture medium

[SOURCE: ISO 19040-2:2018, 3.9.]

**3.296**

**instrument performance check solution**

solution used to determine and control the instrument drift for relevant analytes

**3.297****internal standard**

analogue, such as isotope-labelled, of an *analyte* (3.31) added to samples prior to extraction against which the concentrations of native analytes are calculated

**3.298****interstitial water**

water which is retained in the interstices (or spaces) between solid particles in the interstices (or spaces) between solid particles

**3.299****intertidal zone**

region of shoreline between the limits of mean high and mean low tide levels

**3.300****ion exchange**

process by which certain anions or cations in water are replaced by other ions by passage through a bed of ion-exchange material

**3.301****ion-exchange material**

material capable (without substantial structural changes) of reversible exchange of ions between itself and a liquid in contact with it

**3.302****ionic balance**

algebraic sum of the product of the molar concentration and ionic charge of each cationic and anionic species present

Note 1 to entry: In all waters this sum shall be equal to zero. Any deviation from zero, of the balance calculated from the actual analytical results, is an indication either of the incompleteness of the determination (some ions not determined) or errors in analysis.

**3.303****ionic strength**

defined as  $I = 0,5 \sum C_i (Z_i)^2$

where

$I$  is the ionic strength (in mol/l),

$C_i$  is the concentration of ion (in mol/l) and

$Z_i$  is the charge number of ion  $i$

Note 1 to entry: The ionic strength is necessary for the calculation of the activities of the individual ions in water containing a mixture of ions.

**3.304****iron bacteria**

group of bacteria which is able to derive energy by oxidizing iron (II)

Note 1 to entry: Iron(III) hydroxide obtained after oxidation of iron(II) can then be deposited inside or outside the bacterial sheaths.

**3.305****irrigation water**

water which is applied to soils or plant growth substrates in order to increase their moisture content, to provide the necessary water for normal plant growth and/or to prevent the accumulation of excess salts in the soil

**3.306**

**isokinetic sampling**

technique in which the sample from a water stream passes into the orifice of a sampling probe with a velocity equal to that of the stream in the immediate vicinity of the probe

**3.307**

**isotope dilution**

method using isotopically labelled internal standards to correct for losses during sample preparation and analysis

**3.308**

**keeper solvent**

high-boiling-point solvent added to the sampling standard solution or sample extract to ensure analytes of interest are not lost during concentration

**3.309**

**laboratory sample**

sample(s) or subsample(s) sent to or received by the laboratory

**3.310**

**lag phase**

time from the start of a test until adaptation and selection of the degrading micro-organisms are achieved and the degree of biodegradation of a chemical compound or organic matter has increased to about 10 % of the biodegradation maximum level

[SOURCE: ISO 14855-2:2018, 3.7.]

Note 1 to entry: Lag phase is expressed in days.

**3.311**

**lagoon**

shallow body of water, such as a pond or lake, close to the sea and usually with a shallow, restricted inlet from the sea

**3.312**

**lake**

inland body of water of considerable area

Note 1 to entry: Large saline lakes are often called seas.

**3.313**

**land treatment**

treatment (and usually disposal) of wastewater, by irrigation onto land

**3.314**

**Langelier index**

value obtained by subtracting the saturation pH (pH<sub>s</sub>) from the measured pH of a water sample

Note 1 to entry: The pH<sub>s</sub> is the calculated pH that would be obtained if the water were in equilibrium with solid calcium carbonate.

**3.315**

**leachate**

water which has percolated through tipped refuse or other specified permeable material

**3.316**

***Legionella specie***

genus of gram-negative bacilli microorganisms. The primary growth factor required is L-cysteine, iron is also essential, and other compounds are necessary for optimal growth

Note 1 to entry: Obligate aerobes, the bacteria grow at temperatures ranging from 20 °C to 42 °C. Some strains, especially *Legionella pneumophila* infects humans, and cause legionellosis (legionnaire's disease).

**3.317*****Leptospira specie***

*bacteria* (3.53) excreted by rats, mice, dogs, and certain other wild and domestic animals

Note 1 to entry: genus of spirochaete bacteria, excreted by rats, mice, dogs, and certain other wild and domestic animals may infect humans (particularly through damaged skin) who come into contact with water and soil polluted by such excretions, causing leptospiral jaundice (Weil's disease, leptospirosis).

**3.318****lethal concentration****LC50**

concentration of a toxic substance which kills one half of a group of test organisms

Note 1 to entry: Usually the exposure to the substance is continuous and the LC50 is defined by reference to a specified exposure period.

**3.319****LID<sub>egg</sub>**

dilution within a test batch in which at least 90 % of the fish eggs do not show any effect

**3.320****limit of quantification**

lowest concentration of a *measurand* (3.31) that can be determined with acceptable precision under the stated conditions of the test

Note 1 to entry: as such defined, LOQ is based on evaluation of precision. This does not encompass neither any eventual bias, nor laboratory measurement uncertainty at LOQ level

**3.321****linearity**

ability to provide measured quantity values that are directly proportional to the value of the *measurand* (3.31) in the sample

Note 1 to entry: For each concentration, a mean and standard deviation is calculated and a segment is calculated as twice the standard deviation. If the straight line obtained by linear regression of all measurements crosses every calculated segment, then the sensor is said to be linear.

Note 2 to entry: Straight line relationship between the (mean) result of measurement (signal) and the quantity (concentration) of the component to be determined.

**3.322****littoral zone**

shallow marginal zone of a body of water where light penetrates to the bottom; usually colonized by rooted vegetation

**3.323****lowest ineffective dilution****LID**

toxicity testing of waste water by means of a defined dilution (*D*) most concentrated test batch at which no inhibition, or only effects not exceeding the test specific variable, are observed

**3.324****lowest observed effect concentration****LOEC**

lowest tested concentration of the test sample at which a significant effect (usually at  $p < 0,05$ ) is observed when compared with the control

[SOURCE: ISO 12890:1999, 3.2]

**3.325**

**luminescent bacteria**

group of bacteria capable of transforming into light a specified portion of energy released by metabolism

Note 1 to entry: See also ISO 11348.

**3.326**

**lysimeter**

bed or columnar container of soil adapted for measurement of evapo-transpiration, percolation and leaching losses under controlled conditions

**3.327**

**macroscopic organism**

*algae* (3.21) and animals that are visible without magnification equipment ( $\geq 1$  mm) and which can be recorded in the field

Note 1 to entry: Certain macroscopic organisms can require microscopic inspection for identification. For microscopy of collected material, the lower size limit is set to 1 mm.

**3.328**

**macrophyte**

large aquatic vegetation, visible to the naked eye, including phanerogams, bryophytes, colonial *algae* (3.21) (including *cyanobacteria* (3.149)) and macroalgae

**3.329**

**mass balance**

relationship between input and output of a specified substance in a defined system

Note 1 to entry: For example in a lake, river or sewage treatment works, taking into account the formation or decomposition of that substance in the system.

**3.330**

**matrix potential**

combination of forces, independent of gravity, acting on soil water (water contained within the pores of a soil/rock matrix) that exists as a result of the attraction of solid surfaces to water and the attraction of water molecules to each other

Note 1 to entry: Generally, the smaller the particle size, the higher the matrix potential.

**3.331**

**mean relative difference  
unweighted mean *RD***

value obtained by calculating the average of the relative differences between *N* paired counts

**3.332**

**mean result**

average value of *n* results, calculated as intensity (ratio) or as mass concentration ( $\rho$ )

Note 1 to entry: The mass concentration is expressed in units of milligrams per litre, mg/l.

**3.333**

**membrane filtration**

technique for removing or concentrating particles, including microorganisms (but not free viruses) from fluids by filtration through a filter of known pore size

Note 1 to entry: The technique has various physico-chemical and microbiological applications, such as the "sterilization" of liquids and gases and the separation of microorganisms from free viruses for their separate examination and/or quantitative assessment.

**3.334****mesophilic digestion**

anaerobic digestion of sludge at a temperature of from 40 °C to 45 °C, thereby encouraging the growth of micro-organisms that grow best in this temperature range, that is to say mesophilic micro-organisms

**3.335****mesophilic microorganism**

microorganism whose optimum temperature for growth lies between about 20 °C and 45 °C

**3.336****mesotrophic water**

water of intermediate nutrient status, naturally occurring or due to nutrient enrichment, between oligotrophy and eutrophic states

**3.337****metalimnion****thermocline**

layer in a thermally stratified body of water in which the temperature gradient is at a maximum

**3.338****methaemoglobinaemia**

condition of the blood which occurs in infancy due to methaemoglobin excess when nitrites, formed in the gut mainly by bacterial reduction of ingested nitrates, become attached to haemoglobin, and interfere with oxygen uptake and transport, thus causing cyanosis

**3.339****methyl red endpoint alkalinity**

arbitrary measurement of the total alkalinity of water obtained by titration of the methyl red indicator end point (pH 4,5)

**3.340****micropollutant**

anthropogenic chemicals that occur in the aquatic environment above a natural background level due to human activities but with concentrations remaining at trace levels (i.e. up to the microgram per litre range)

**3.341****microstrainer**

rotating cylindrical frame covered with a very fine mesh, usually of stainless-steel wire

Note 1 to entry: It rotates about a horizontal axis, is largely submerged in the water being screened and is backwashed to remove solids.

**3.342****migration**

spontaneous or induced movement of dissolved or particulate matter or organisms in a body of water

**3.343****mineral water**

water which contains more mineral substances than normal *potable water* ([3.193](#))

**3.344****mineralization**

breakdown of organic matter to carbon dioxide, water and the hydrides, oxides or mineral salts of any other elements present

**3.345****mixed bed**

intimate physical mixture of anion-exchange material and cation-exchange material

**3.346**

**mixed liquor suspended solid**

**MLSS**

concentration of solids, expressed in a specified dried form, in the mixed liquor

**3.347**

**mixed media filtration**

water treatment process whereby the water is passed through two or more layers in a downward or upward direction

Note 1 to entry: The upper layer consists of large particles of low density. In each following layer the particles are smaller, but the density of the particles is higher.

**3.348**

**mobile sediment**

solid material which is amenable to movement within a body of water

Note 1 to entry: The amenability is related to the mass of the sediment and the flowrate of the water.

**3.349**

**monitoring**

programmed process of sampling, measurement and subsequent recording or signalling, or both, of various water characteristics, often with the aim of assessing conformity to specified objectives

**3.350**

**most probable number**

**MPN**

maximum likelihood estimate of the number of microorganisms in a specified volume of water, derived from the combination of positive and negative results in a series of volumes of the sample examined by standard tests

Note 1 to entry: The multiple tube or wells in a tray method are a set of these standard tests for determining the MPN.

**3.351**

**multi-level sampler**

single installation for sampling groundwater from discrete depths within the sub-surface

Note 1 to entry: The device can be driven directly into the ground, installed in a pre-existing borehole or installed in a purpose-drilled hole. When installed in a borehole, integral packers are used to isolate individual sample ports.

**3.352**

**multiple boreholes**

group of individual boreholes or piezometers installed separately to form a monitoring network that is adequate for the purpose of an investigation

**3.353**

**mutagen**

substance capable of causing genetic changes in living organisms

**3.354**

**mutation**

**chromosomal mutation**

permanent hereditary change in the genetic material (*DNA* (3.189) or *RNA* (3.482)) of living organisms or viruses, usually in a single gene, which may be in the form of a loss (deletion), gain (translocation), or exchange (transduction) of genetic material (one or more nucleotides), resulting in a change of the genetic code which can alter the function of the gene

Note 1 to entry: Substances capable of inducing mutations are called mutagens or mutagenic, and affected organisms are called mutants.

**3.355****negative control**

<ecotoxicology> test which does not contain any *analyte* (3.31) in the sample and therefore no response or result is expected

**3.356****nested piezometers**

group of piezometers installed within a single larger-diameter borehole

Note 1 to entry: In general, each piezometer should be designed to allow sampling over a specific depth interval within the aquifer. Piezometer tips are isolated from each other by installing a permanent impermeable seal between them.

**3.357****net intensity ratio**

net intensity divided by the intensity of a reference element

**3.358****night soil**

human wastes accumulated in a container and removed periodically

Note 1 to entry: These used to be removed at night, hence the name.

**3.359****nitrification**

oxidation of ammonium compounds by bacteria

Note 1 to entry: Usually the intermediate product is nitrite and the end product nitrate.

**3.360****non-ionic surface active agent**

surface active agent which does not produce ions in an aqueous solution

Note 1 to entry: The solubility in water of non-ionic surface active agents is due to the presence in the molecules of functional groups which have a strong affinity for water.

**3.361****no observed effect concentration****NOEC**

test concentration immediately below the lowest *observed effect concentration (LOEC)* (3.324)

[SOURCE: ISO 12890:1999, 3.4.]

**3.362****non-point source pollution****diffuse source pollution**

pollution of surface or ground waters which arises not from a single point but rather in a widespread manner

EXAMPLE Leaching from the land.

**3.363****nucleic acid**

hereditary genetic material typically in the form of a double helix consisting of nucleotides linked together in a specific sequence which determines the genetic code

**3.364****nucleotide**

one of the components of the genome (adenine, guanine, cytosine and thymine or uracil) which is linked together by sugar and phosphate groups to form nucleic acid strands (chains), the sequence of which determines the genetic code of the genome

**3.365**

**number of revertants  
number of mutants**

number of visible mutant colonies per dish (plate of diameter approximately 9 cm) at the termination of the assay

Note 1 to entry: Most applicable in *Salmonella* microsome mutagenicity assay

**3.366**

**nutrient removal**

biological, physical and chemical processes used in water and waste-water treatment specifically for the removal of nutrients such as nitrogen and phosphorus

**3.367**

**obligate aerobe**

organism that requires oxygen to grow

**3.368**

**obligate anaerobe**

organism that is killed in normal atmospheric oxygen concentrations (20,95 %) and some are only able to grow at an oxygen concentration of less than 0,5 %

**3.369**

**odour threshold**

minimum level of odour detectable by the olfactory senses of a panel of judges

Note 1 to entry: There is no absolute value for odour threshold due to the inherent variability in individual olfactory sensitivity, but a value is estimated by serially diluting a sample with odour-free water until the odour is just not detectable.

**3.370**

**oligosaprobic**

highly oxygenated aquatic environment in which little organic material and a minimum of fermentation is present

**3.371**

**oligotrophic**

description of a body of water which is low in nutrients that is usually accompanied by an abundance of dissolved oxygen, high transparency, low biomass and bottom deposits which contain only small amounts of organic matter

**3.372**

**organic nitrogen**

difference between the nitrogen contents of a sample derived from the determination of Kjeldahl nitrogen and ammoniacal nitrogen

**3.373**

**organoleptic**

descriptive attributes of water (e.g. colour, taste, odour and appearance) that are perceptible by the sense organs

**3.374**

**overlap error  
crowding error**

<microbiology> systematic depression of colony counts due to confluence of colonies

Note 1 to entry: Quantitatively, overlap error depends primarily on the fraction of available growth space occupied by colonial growth.

**3.375****overnight culture**

culture started late in the afternoon and incubated overnight (usually about 16 h) to be ready during the following morning for purposes such as the inoculation of a preculture

**3.376****oxidation ditch****oxidation channel**

system for treating crude or settled sewage, often taking the form of parallel channels joined at the ends to form a closed circuit and equipped with aeration rotors

**3.377****oxidation pond**

basin used for the retention of wastewater before final disposal, in which biological oxidation of organic material is affected by transfer of oxygen from air to the water, either naturally or artificially accelerated

**3.378****oxidation-reduction potential****redox potential****ORP**

electrical potential between an electrode of an inert metal, such as platinum, or of carbon, and the standard hydrogen electrode

Note 1 to entry: The more positive the potential, the more oxidized the environment, and the more negative the potential, the more reduced the environment.

**3.379****oxygen deficit**

difference between the actual dissolved oxygen concentration of an aqueous system and its oxygen saturation value

**3.380****oxygen sag curve**

curve resulting from plotting the concentration of dissolved oxygen against distance or time of flow in a river downstream from a source of pollution that has an oxygen demand

**3.381****oxygen saturation value**

concentration of dissolved oxygen in equilibrium, either with air (natural systems) or with pure oxygen (oxygen waste-water treatment systems)

Note 1 to entry: It varies with temperature, partial pressure of oxygen and salinity.

**3.382****ozonization****ozonation**

addition of ozone to water or wastewater for the purpose of, for example, disinfection, oxidation of organic matter, or the removal of unpleasant taste and odour

**3.383****package plant**

prefabricated compact water or sewage treatment plant usually designed to treat small flows

**3.384****packer**

device or material for temporarily isolating specified vertical sections within boreholes in order to attempt groundwater sampling from discrete zones or locations within the borehole or *aquifer* ([3.40](#), [3.41](#), [3.42](#))

**3.385**

**parallel count**

microbiological measurement of particle, colony numbers, tubes and wells in equal analytical portions drawn from the same sample

Note 1 to entry: Parallel determinations are particle or colony numbers counted from replicate samples.

**3.386**

**parameter**

property of a substance used to characterize it

Note 1 to entry: For example, water.

**3.387**

**pasteurization**

process involving the elevation of temperature for an appropriate period of time, for the purpose of either inactivating microorganisms, particularly pathogens, or decreasing their number for a limited period of time, to a specified level or to a value below the infective dose

**3.388**

**pathogen**

organism capable of producing disease in a susceptible plant or animal, including humans

**3.389**

**pattern**

chromatographic fingerprint of any series of isomers in the same chemical family, e.g. PCB PBDE, SCCP

**3.390**

**pelagic organisms**

organisms living in a free body of water beyond the *littoral zone* ([3.322](#))

**3.391**

**perched water table**

isolated body of groundwater, which is limited in lateral and vertical extent, located within the unsaturated zone overlying a much more extensive groundwater body

**3.392**

**permanent culture**

<microbiology> culture stored frozen in order to preserve its genetically determined characteristics

**3.393**

**permanganate index**

<water> mass concentration of oxygen equivalent to the amount of permanganate ion consumed when a water sample is treated with that oxidant under defined conditions

**3.394**

**permeability**

property of a membrane or other material characterizing its ability to selectively permit substances to pass through it

**3.395**

**phenolphthalein endpoint alkalinity**

measurement by titration to the phenolphthalein endpoint (pH 8,3) of that portion of alkalinity arbitrarily attributed to all the hydroxyl and half the carbonate content of a water

Note 1 to entry: Phenolphthalein endpoint alkalinity is often used in conjunction with methyl red endpoint alkalinity.

**3.396**

**photoautotrophic bacteria**

*bacteria* ([3.53](#)) which obtain their energy from light, and whose sole source of carbon is inorganic, such as CO<sub>2</sub>

**3.397****photosynthesis**

synthesis of organic matter from carbon dioxide and water in the presence of light by living organisms, employing photochemically reactive pigments

**3.398****physico-chemical treatment**

combination of physical and chemical treatments to achieve a specific result

**3.399****phytoplankton**

free floating flora and bacteria found in fresh or saline water bodies including diatoms, [dinoflagellates](#), [cyanobacteria](#) ([3.149](#)) and [algae](#) ([3.21](#))

**3.400****piezometer**

device consisting of a tube or pipe with a porous element or perforated section (surrounded by a filter) on the lower end (piezometer tip) which is installed and sealed into the ground at an appropriate level

**3.401****piezometric ground water level**

level to which water rises naturally in a well

**3.402****pile-up**

processing by a radiation spectrometer of pulses resulting from the simultaneous absorption of particles, or photons, originating from different decaying nuclei, in the radiation detector

Note 1 to entry: As a result, they are counted as one single particle or photon with an energy between the individual energies and the sum of these energies.

**3.403****pile-working**

process whereby the specific density of a bottom sediment sample is increased by the forces created inside a core tube when downward pressure is applied to the sampling device

Note 1 to entry: These compressional forces occur as a result of friction against the side wall of the tube and the resistance of the main body of the material being sampled.

**3.404****plankton**

organisms drifting or suspended in water, consisting mostly of unicellular algae and micro invertebrate animals

**3.405****plate**

solidified mixture of dilution water, agar and other possible constituents (such as inorganic salts) in a petri dish

**3.406****plate count****colony count**

estimate of the numbers of viable microorganisms in a given volume of sample, obtained from the number of colonies which form in, or on, a given culture medium under specified condition

Note 1 to entry: Viable microorganisms include bacteria, yeasts and moulds.

**3.407****plateau phase**

time from the end of the biodegradation phase to the end of the test

[SOURCE: ISO 17556:2019, 3.9.]

**3.408**

**plug-flow system**

system that theoretically, if not in practice, achieves complete mixing in the cross-section of a channel but allows no mixing or diffusion in the direction of flow

**3.409**

**plumbo-solvent**

type of a water which is able to dissolve lead from pipes and fitting

**3.410**

**plume**

distribution of water, from a point source, discharging into a body of water of different physical and/or chemical properties before mixing has occurred

**3.411**

**point mutation**

**gene mutation**

mutation resulting from a change in a single-base pair (pair of nucleotides) in a gene, referred to as a deletion (loss of a nucleotide), insertion (addition of a nucleotide) or frameshift mutation (change in sequence of nucleotides)

**3.412**

**point source pollution**

pollution arising from an identified single point

EXAMPLE Example A polluted factory *effluent* ([3.201](#)).

**3.413**

**Poisson distribution**

discrete frequency distribution which gives the probability of a number of independent events occurring in a fixed time

**3.414**

**pollution**

alteration of water, air or soil quality, mainly by discharge of organic, microbiologic and chemicals substances coming from anthropic activities or from natural sources (e.g. volcanic ash)

**3.415**

**pollution load**

quantity of pollutants entering a treatment plant or discharged into a receiving water during a given period

**3.416**

**Polychlorinated biphenyls**

**PCB**

biphenyls having chlorine substituents

Note 1 to entry: By convention, it is a collective term for biphenyls having chlorine substitutes, but in practice, it also includes monochlorinated biphenyls.

**3.417**

**polyelectrolyte**

polymer having ionized groups, some types of which are used for coagulating colloidal particles and/or flocculating suspended solids

**3.418****polynuclear aromatic hydrocarbon**  
**PAH**

organic compound composed of two or more benzene rings where the adjacent rings share two carbon atoms, non-aromatic rings may also be present

Note 1 to entry: Some PAHs, including benzo[*a*]pyrene, indeno[1,2,3-*cd*]-pyrene and benzo[*b*]fluoranthene, have been shown to be carcinogenic to laboratory animals and may be carcinogenic to humans.

**3.419****polysaprobic water**

extremely polluted water characterized by a heavy load of organic matter, serious deoxygenation, a marked change of aquatic population structure and composition, and high bacterial numbers

**3.420****pond**

shallow, inland body of fresh water of small dimensions

**3.421****ponding**

occurrence of pools of liquid on a biological filter caused by blockage of its interstices

**3.422****positive control**

test which contains a known amount of the *analyte* (3.31) in the test material which will produce a known response

**3.423****post-chlorination**

*chlorination* (3.110) following water or waste-water treatment

**3.424****practical salinity**

$S_p$

dimensionless value which, for the purposes of checking water quality, may be regarded as an estimate of the concentration, in grams per kilogram, of the dissolved salts in seawater

Note 1 to entry: It is defined algorithmically, in terms of the ratio (K15) of the electrical conductivity of the sample, at 15 °C and 101,3 kPa (1 atm), to that of a defined potassium chloride solution (32,436 6 g kg<sup>-1</sup> of sample) at the same temperature and pressure.

**3.425****prechlorination**

preliminary treatment of raw water with chlorine in order to arrest or substantially reduce bacterial, plant or animal growth, to oxidize organic and inorganic matter, to assist *flocculation* (3.234) and/or to reduce odour

**3.426****precision**

closeness of agreement between indications or measured quantity values obtained by replicate measurements on the same or similar objects under specified conditions

**3.427****preconditioning**

pre-incubation of an inoculum under the conditions of the test in the absence of the chemical compound and/or organic matter, with the aim of improving the performance of the test by *acclimatization* (3.4) of the micro-organisms to the test conditions

[SOURCE: ISO 9439:1999, 2.14.]

**3.428**

**preculture**

culture of micro-organisms grown under conditions which promote their adaptation to the test conditions as part of the preparation of an inoculum for a particular test, such as genotoxicity assays

**3.429**

**pre-exposure**

pre-incubation of an inoculum in the presence of a chemical compound and/or organic matter, with the aim of enhancing the ability of this inoculum to biodegrade the test material by adaptation and selection of the micro-organisms

[SOURCE: ISO 10708:1997, 3.12.]

**3.430**

**preliminary treatment of wastewater**

removal or disintegration of gross sewage solids and the removal of grit

Note 1 to entry: It can include the removal of grease and oil from sewage prior to sedimentation and pre-aeration and neutralization.

**3.431**

**pressure filtration**

water treatment process whereby water is passed through an enclosed system under pressure

Note 1 to entry: Pressure filtration is similar to rapid sand filtration.

**3.432**

**presumptive count**

colony count or *most probable number (MPN)* (3.350) estimate based on the number of colonies, wells or fermentation tubes that have an outward appearance that is interpreted as typical of a target organism

Note 1 to entry: For methods that do not require confirmation steps, presumptive count is equal to the confirmed count" (see *confirmed count* (2.132))

**3.433**

**primary anaerobic biodegradation**

level of degradation achieved when a test compound undergoes any structural change, other than complete *mineralization* (3.344), as a result of anaerobic microbial action

[SOURCE: ISO 11734:1995, 3.2.]

**3.434**

**primary biodegradation**

structural change (transformation) of a chemical compound by micro-organisms resulting in the loss of a specific property

[SOURCE: ISO 10708:1997, 3.2.]

**3.435**

**primary degradation**

degradation of the molecular structure of a substance to an extent sufficient to remove some characteristic property

**3.436**

**primary productivity**

<ecology> rate of *photosynthesis* (3.397) of *algae* (3.21) or plants in a community

**3.437****primary validation****full validation**

establishment of the specifications for the performance of a new method and/or experimental verification that a method meets theoretically derived quality criteria

Note 1 to entry: See also ISO 13843 and ISO 17994 for water microbiology.

**3.438****profundal zone**

lower region of deep water characterised by the absence of *photosynthesis* (3.397) (*aphotic zone* (3.37)) and the prevalence of organic degradation mechanisms (tropholytic zone)

**3.439****prokaryote**

unicellular organism which does not have a nucleus with a membrane nor other specialised membrane bound organelles

**3.440****propagule****germ**

viable entity, such as vegetative cell, group of cells, spores, spore cluster, fungal mycelium, seed, plant cutting, capable of growth in a nutrient medium

**3.441****proportional sampling**

technique for obtaining a sample from flowing water in which the frequency of collection (in the case of discrete sampling), or the sample flow rate (in the case of continuous sampling), is directly proportional to the flow rate of the sampled water

**3.442****proportionality**

measure of bias change throughout the *analyte* (3.31) concentration range for an analytical method, analytical instrument, or analytical sensor

Note 1 to entry: Proportionality is determined by measuring a selection of reference samples throughout the operational range and plotting the bias against the reference values.

Note 2 to entry: All the reference samples are created by dilution from a common root (parent) sample, whereas for the similar parameter "linearity", each reference sample is independent.

**3.443****protista**

prokaryotic bacteria and eukaryotic algae, fungi and protozoa of microscopic size

**3.444****protozoa**

phylum of unicellular eukaryotic animals varying from simple uninucleate organisms to cell colonies or highly organized structures and with a considerable diversity of forms and nutrition

**3.445*****Pseudomonas* specie**

group of aerobic, Gram-negative, oxidase-positive, catalase-positive, non-sporeforming bacteria which are ubiquitous in the aquatic environment and which can utilize many simple organic and inorganic substances for growth

Note 1 to entry: Many of them produce soluble, fluorescent or coloured pigments.

Note 2 to entry: Some strains, especially *Pseudomonas aeruginosa*, infect humans, and cause infection and serious disease".

**3.446**

**psychrophilic microorganism**

microorganism which grows at temperatures below  $20 \pm 2$  °C.

**3.447**

**pulse dose**

almost instantaneous addition of a known quantity of tracer chemical or reagent to flowing water, for example, by up-ending a container

**3.448**

**putrefaction**

uncontrolled decomposition of organic matter due to anaerobic microbial action, with the production of offensive odour

**3.449**

**pycnocline**

layer in a stratified body of water in which the density gradient is at a maximum

**3.450**

**qualitative method**

method of analysis whose response is either the presence or absence of the *analyte* (3.31) in a sample

**3.451**

**quantitative repeatability  
measurement repeatability**

measurement precision under repeatability conditions of measurement which are the same measurement procedure, same operators, same measuring system, same operating conditions and same location, and replicate measurements on the same or similar objects over a short period of time

**3.452**

**quantitative reproducibility  
measurement reproducibility**

measurement precision under reproducibility conditions of measurement such as different locations, operators, measuring systems, and replicate measurements on the same or similar objects

**3.453**

**radioactive tracer  
radiochemical tracer**

substance labelled with one or more radionuclides used to trace the course of a biological, chemical or physical process

**3.454**

**rainwater**

water arising from atmospheric precipitation, which has not yet collected soluble matter from the Earth's surface

**3.455**

**random error**

component of measurement error that in replicate measurements varies in an unpredictable manner

**3.456**

**raw sewage**

untreated sewage

**3.457**

**raw water**

water which has received no treatment whatsoever, or water entering a plant for treatment or further treatment

**3.458****reach**

length of water course with defined upstream and downstream limits

**3.459****readily biodegradable substance**

substance which can be degraded biologically to a specified degree according to specified tests for ultimate *biodegradability* (3.68)

**3.460****re-aeration**

process whereby air is re-introduced to increase the concentration of dissolved oxygen after the oxygen has been depleted by some chemical or biological process

**3.461****receiving water body**

water body which receives an input of material, of either natural or anthropogenic origin

Note 1 to entry: The term often appears in the context of contamination (for example *effluent* (3.201) from municipal waste-water outlets or industrial processed water). Receiving water body surveys describe the state of contamination in a given area.

**3.462****receptor**

entity that is vulnerable to the adverse effect(s) of a hazardous substance or agent

**3.463****recirculation**

return of a portion of partially or fully treated waste from any unit process in a waste-water treatment system to a preceding unit process

**3.464****recovery**

particles estimated in a test portion or sample, with the understanding that there is a true (although unknown) number of particles of which 100 % or less are "recovered" by the employed methodology

**3.465****recovery standard**

analogue, such as isotope-labelled, of an *analyte* (3.31) added to samples prior to a reaction, like injection into a gas chromatograph, to facilitate calculation of the recovery of the analytes

**3.466****reference method**

prescribed analytical method by a qualified authority to analyse a given group or species of microorganisms

Note 1 to entry: As a rule, the reference method is a standard or commonly used method.

**3.467****reference station**

one or more sampling stations chosen to represent environmental conditions in a given area, for instance free from direct anthropogenic influences

**3.468****regeneration**

ion exchange process of restoring an ion-exchange material after use to its operationally effective state

**3.469****relative accuracy**

<method> degree of correspondence between the response obtained by the reference method and the response obtained by the alternative method on identical samples

**3.470**

**relative difference between means**

relative difference calculated from the average counts of two sets of results

**3.471**

**relative recovery**

<microbiology> ratio of colony counts obtained using method A relative to the *colony counts* (3.131) obtained using method B, when equal test portions of the same suspension are used, and method B is the reference method

**3.472**

**repeatability limit**

*r*

repeatability critical difference for a specified probability of 95 %

**3.473**

**representativeness**

extent to which the composition of the samples reflects conditions in the body of water of interest

[SOURCE: ISO 5667-14:2014, 3.4, modified — Condition changed to composition"]

**3.474**

**reproducibility conditions**

set of conditions that includes different locations, operators, measuring systems, and replicate measurements on the same or similar objects

**3.475**

**reproducibility limit**

*R*

reproducibility critical difference for a specified probability of 95 %

**3.476**

**reproducibility standard deviation**

standard deviation of test results or measurement results obtained under reproducibility conditions

**3.477**

**reservoir**

construction, partially or wholly man-made, for storage and/or regulation and control of water

**3.478**

**residual chlorine**

chlorine remaining in solution after chlorination, present in the form of free chlorine or combined chlorine, or both

**3.479**

**respiration**

exchange of gases between an organism and its environment resulting from the oxidation of substrate with the release of energy

Note 1 to entry: It may be accomplished either aerobically or anaerobically.

**3.480**

**reverse osmosis**

flow of water through a membrane from a more concentrated to a less concentrated solution, as a result of applying pressure to the more concentrated solution in excess of the normal osmotic pressure

**3.481**

**river**

natural body of water flowing continuously or intermittently along a well-defined course into an ocean, sea, lake, inland depression, marsh or other watercourse

**3.482****RNA****ribonucleic acid**

usually known as part of the genetic material, which in the case of RNA viruses is the sole constituent of the *genome* (3.253)

Note 1 to entry: Differs from DNA in having uracil instead of thymine as one of the nucleotides.

**3.483****robustness****ruggedness**

insensitivity of an analytical method to small changes in procedure

**3.484****S9 fraction**

< *Salmonella* microsome test > supernatant at 9 000 g of a tissue homogenate in 0,15 mol/l KCl, obtained from livers of male rats (200 g to 300 g) pretreated with a substance or substance combination appropriate for enzyme induction

**3.485****S9 mix**

< *Salmonella* microsome test > mixture of S9 fraction and co-factor solution

**3.486****saline water**

water containing dissolved solids at a concentration higher than acceptable standards for intended use

Note 1 to entry: The concentration of total dissolved solids in brackish water can vary from 1 000 mg/l to 10 000 mg/l. Brackish water is less saline than sea water (1 000 to 10 000 mg/l of TDS for brackish vs up to 35 000 mg/l for sea water).

Note 2 to entry: The concentration of total dissolved solids of many brackish waters can vary considerably over space and/or time.

**3.487*****Salmonella* specie****salmonellae**

genus of aerobic and facultatively anaerobic rod-shaped Gram-negative, non-spore-forming, oxidase-negative enteric bacteria which fail to ferment lactose

Note 1 to entry: See also ISO 19250.

Note 2 to entry: They can be further identified serologically, by bacteriophage typing or by molecular techniques for epidemiological and other purposes. They can cause intestinal infections (salmonellosis) in man and animals, and are a common cause of food poisoning in humans. *Salmonella typhi* causes typhoid fever in humans. *Salmonella* species are excreted in the faeces of patients cases and healthy carriers (both in humans and animals), and may, therefore, occur in sewage and farm wastes.

**3.488****salmonid****salmonid fish**

fish belonging to the biological family *Salmonidae*, often used as indicators of water quality

EXAMPLE Atlantic salmon, brown trout or char.

**3.489****sample**

portion, ideally representative, taken from a specified body of water, from air, sludge, soil and other types of materials, either discretely or continuously, for the purpose of examination of various defined characteristics

**3.490**

**sample stabilization**

process which is intended to minimize, by addition of chemicals or change of physical conditions, or both, the changes in characteristics of species of interest during the period from time of sampling to the time of examination

**3.491**

**sampling station**

precise location where recording is carried out and any samples are collected

Note 1 to entry: A sampling station is defined by its geographical position (OS National Grid Reference, latitude, longitude), its depth (relative to chart datum and normalized to mean low water as given in tide tables) and any other information on physical conditions such as substrate type, slope and orientation.

**3.492**

**sampler**

device used to obtain a sample of water, sludge, soil and other types of materials either discretely or continuously, for the purpose of examination of various defined characteristics

**3.493**

**sampling**

process of removing a portion of water from a water body or supply (dam, river, pipe, tap, pond or process unit), intended to be representative, for the purpose of examination of various defined characteristics

**3.494**

**sampling line**

conduit which leads from the sampling probe to the sample delivery point or the analysing equipment

**3.495**

**sampling network**

system of predetermined sampling locations designed to monitor one or more specified sites

**3.496**

**sampling point**

precise position within a sampling location from which samples are taken

**3.497**

**sampling probe**

part of sampling equipment which is inserted into a body of water and into which the water sample initially passes

**3.498**

**saprobic**

associated with decaying organic matter

**3.499**

**saturated zone**

part of an aquifer in which the pore spaces of the formation are completely filled with water

**3.500**

**scale deposit**

adherent inorganic deposit formed on surfaces by water which has become supersaturated with respect to one or more solutes, or destabilized by loss of carbon dioxide, for example, by boiling

**3.501**

**scissor grab**

bottom-sediment sampling device consisting of two open-topped mutually hinged buckets which close, whilst the sample is being taken, in a manner analogous to scissor blades closing

Note 1 to entry: See also ISO 5667-12.